

What is claimed is:

1. An endoscope probe system including an endoscope probe to be inserted into a body cavity to observe in vivo tissues, comprising:

a laser source that emits a plurality of laser beams;
a light detector having a plurality of light receiving elements, each of said light receiving elements detecting intensity of light incident thereon; and

a plurality of confocal optical systems arranged to converge the plurality of laser beams emitted by said laser source to small spots on the tissues and selectively transmit the plurality of laser beams reflected by the tissues to said light receiving elements of said light detector, respectively.

2. The endoscope probe system according to claim 1, wherein said plurality of confocal optical systems are arranged such that the plurality of laser beams emitted by said laser source are converged at positions, on the tissues, in a regular pattern.

3. The endoscope probe system according to claim 2, wherein the regular pattern is a matrix pattern.

4. The endoscope probe system according to claim 1,
wherein said plurality of confocal optical systems
have a common objective lens system and a common light
shielding member disposed between said objective lens
system and said light detector,
wherein said objective lens system converges the laser
beams emitted from said laser source to the small spots on
the tissues,
wherein said light shielding member has a plurality of
minute transparent portions located at positions conjugate
to the spots to which the laser beams are focused by said
objective lens system, and
wherein said light detector receives the laser beams
reflected by the tissues through said minute transparent
portions of said light shielding member.

5. The endoscope probe system according to claim 4,
wherein said minute transparent portions are pin holes
formed on said light shielding member.

6. The endoscope probe system according to claim 4,
wherein said objective lens system is a reducing lens
system.

7. The endoscope probe system according to claim 5,

wherein said plurality of confocal optical systems includes a common beam splitter cube that supports said laser source, said light detector and said light shielding member directing the laser beams emitted by said laser source to said objective lens system while transmitting light reflected back from the tissues and passed through said light shielding member to said light detector.

8. The endoscope probe system according to claim 7,

wherein a first lens array is interposed between said light shielding member and said beam splitter cube to collimate the laser beam reflected back by the target and passed through said minute transparent portions of said light shielding member, and

wherein a second lens array is interposed between said light detector and said beam splitter cube to converge the laser beams traveling from said light shielding member toward said light detector on said light receiving elements of said light detector.

9. The endoscope probe system according to claim 8,

wherein a third lens array is interposed between said laser source and said beam splitter cube to collimate the laser beams emitted from said laser source.

10. The endoscope probe system according to claim 9, wherein each of said first, second, and third lens arrays is formed on one side of a glass plate by locally changing the refractive index of said glass plate.

11. The endoscope probe system according to claim 5, wherein said laser source, said light detector, and said light shielding member are arranged within said endoscope probe.

12. The endoscope probe system according to claim 1, wherein said plurality of confocal optical systems includes a common objective lens system and a plurality of optical fibers disposed between said objective lens and said light detector with distal end surfaces of said optical fibers disposed to face said objective lens system,

wherein said objective lens focuses the laser beams emitted from said laser source to the small spots on the target,

wherein said distal end surfaces of said optical fibers are disposed at positions conjugate to the spots to which the laser beams are focused by said objective lens, and

wherein said light detector receives the laser beams reflected by the target through said optical fibers.

13. The endoscope probe system according to claim 12, wherein said objective lens system is a reducing lens system.

14. The endoscope probe system according to claim 12, wherein said plurality of confocal optical systems include a common beam splitter cube that supports said laser source and said light detector and directs the laser beams emitted from said laser source to said objective lens system while transmitting light reflected back from the target and passed through said optical fibers to said light detector.

15. The endoscope probe system according to claim 14, wherein a first lens array is interposed between said optical fibers and said beam splitter cube to collimate the laser beams reflected back by the target and passed through said optical fibers, and

wherein a second lens array is interposed between said light detector and said beam splitter cube to converge the laser beams emitted from said optical fibers and traveling toward said light detector on said light receiving elements of said light detector.

16. The endoscope probe system according to claim 15, wherein a third lens array is interposed between said laser source and said beam splitter cube to collimate the laser beams emitted from said laser source.

17. The endoscope probe system according to claim 16, wherein each of said first, second, and third lens arrays is formed on one side of a glass plate by locally changing the refractive index of said glass plate.

18. The endoscope probe system according to claim 14, wherein said laser source, said light detector, and said beam splitter cube supporting said laser source and said light detector are placed outside said endoscope probe, and wherein proximal end surfaces of said optical fibers are disposed in a vicinity of said beam splitter cube to receive the laser beams emitted from said laser source through said beam splitter cube and emit the laser beams reflected back by the target toward said light detector through said beam splitter.

19. The endoscope probe system according to claim 1, wherein said laser source is a surface emitting laser.